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USSR STATE STANDARD BOLTS, SCREWS, STUDS AND NUTS TECHNICAL REQ--ETC(U)

NOV 78

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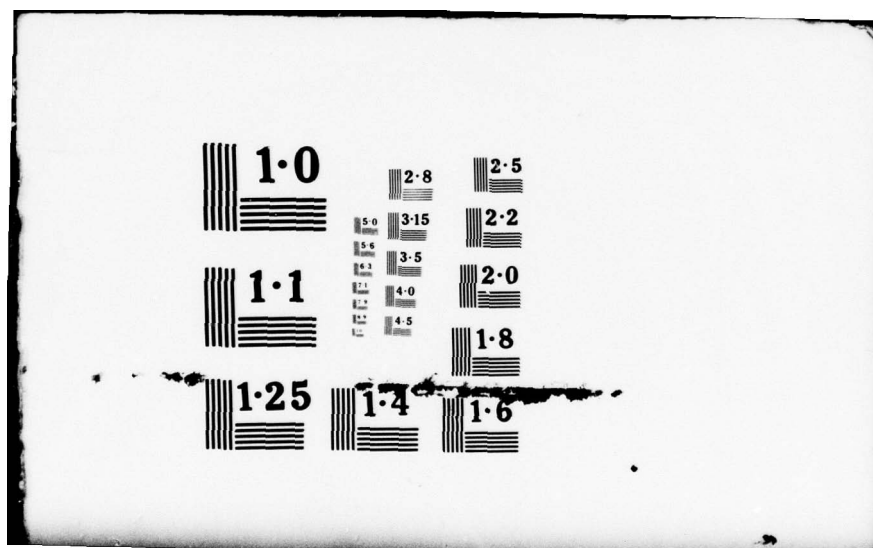
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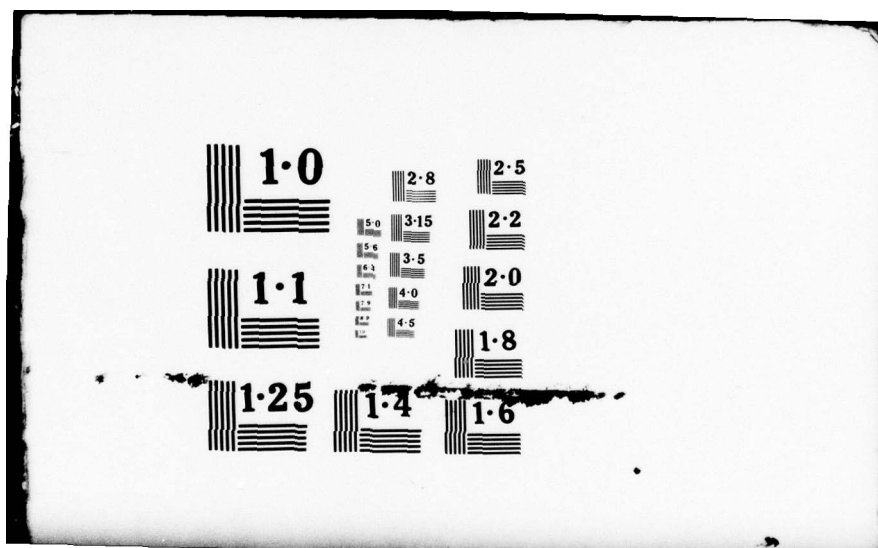
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# FOREIGN TECHNOLOGY DIVISION



USSR STATE STANDARD BOLTS, SCREWS, STUDS AND NUTS  
TECHNICAL REQUIREMENTS GOST 1759-70



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## EDITED TRANSLATION

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USSR STATE STANDARD BOLTS, SCREWS, STUDS  
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1759-70

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# U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<b>А а</b>	A, a	Р р	<b>Р р</b>	R, r
Б б	<b>Б б</b>	B, b	С с	<b>С с</b>	S, s
В в	<b>В в</b>	V, v	Т т	<b>Т т</b>	T, t
Г г	<b>Г г</b>	G, g	У у	<b>У у</b>	U, u
Д д	<b>Д д</b>	D, d	Ф ф	<b>Ф ф</b>	F, f
Е е	<b>Е е</b>	Ye, ye; E, e*	Х х	<b>Х х</b>	Kh, kh
Ж ж	<b>Ж ж</b>	Zh, zh	Ц ц	<b>Ц ц</b>	Ts, ts
З з	<b>З з</b>	Z, z	Ч ч	<b>Ч ч</b>	Ch, ch
И и	<b>И и</b>	I, i	Ш ш	<b>Ш ш</b>	Sh, sh
Й й	<b>Й й</b>	Y, y	Щ щ	<b>Щ щ</b>	Shch, shch
К к	<b>К к</b>	K, k	Ъ ъ	<b>Ъ ъ</b>	"
Л л	<b>Л л</b>	L, l	Ы ы	<b>Ы ы</b>	Y, y
М м	<b>М м</b>	M, m	Ь ь	<b>Ь ь</b>	'
Н н	<b>Н н</b>	N, n	Э э	<b>Э э</b>	E, e
О о	<b>О о</b>	O, o	Ю ю	<b>Ю ю</b>	Yu, yu
П п	<b>П п</b>	P, p	Я я	<b>Я я</b>	Ya, ya

\*ye initially, after vowels, and after Ъ, Ь; e elsewhere.  
When written as ё in Russian, transliterate as yë or ë.

## RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh <sup>-1</sup>
cos	cos	ch	cosh	arc ch	cosh <sup>-1</sup>
tg	tan	th	tanh	arc th	tanh <sup>-1</sup>
ctg	cot	cth	coth	arc cth	coth <sup>-1</sup>
sec	sec	sch	sech	arc sch	sech <sup>-1</sup>
cosec	csc	csch	csch	arc csch	csch <sup>-1</sup>

Russian      English

rot      curl  
lg      log

USSR  
STATE STANDARD  
BOLTS, SCREWS, STUDS AND NUTS  
Technical Requirements

GOST 1759-70

ГОСТ 1759-70

Official Publication

State Committee of Standards  
USSR Council of Ministers  
Moscow

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UDK 621.88 (083.74)

Group G31

USSR STATE STANDARD

BOLTS, SCREWS, STUDS AND NUTS

GOST

Technical Requirements

1759-70\*

Replaces  
GOST 1759-62\*\*

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By Decree of the Committee of Standards, Measures and Measuring Instruments of the USSR Council of Ministers of 18 Nov 1970 No 177 the period of implementation is established

from 1/1 1972

p. 10 in table 9 from 1/1 1975

Failure to observe the standard is punishable by law

This standard extends to bolts, screws, studs and nuts with a thread diameter of from 1 to 48 mm.

The standard incorporates the requirements of the recommendations of SEV for standardization RS 306-71, RS 307-71, RS 309-65, RS 310-65, RS 792-67.

1. Technical Requirements

1.1. In form, dimensions, thread, maximum deviation and surface roughness, bolts, screws, studs and nuts should conform to the requirements established in the measuring standards.

1.2. The mechanical properties of bolts, screws, studs and nuts, made from carbon and alloy steels, and also from brands of steel should conform to those indicated in tables 1 and 2.

Notes:

1. It is not permitted to use acid Bessemer steel for the production of bolts, screws, studs and nuts.

2. Up until 1/1-73 it is permitted to make fastener parts out of steels of the brands standardized in tables 1 and 2 of GOST 380-60 and GOST 4543-61.

\*\* In connection with bolts, screws, studs and nuts with a thread diameter from 1 to 48 mm.

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Official Publication

Reprinting forbidden

\* Reprint (August 1972) with change No 1 published in March 1972.

2-3 GOST 1759-70

Table 1.

Mechanical properties of bolts, screws and studs made from carbon and alloy steel at normal temperature.

(1) Класс прочности	(2) Предел прочности $\sigma_B$ , кгс/мм <sup>2</sup>		(3) Предел текучести $\sigma_T$ , кгс/мм <sup>2</sup>		(4) Ударная вязкость $a_{H5}$ , кгс/см <sup>2</sup>	(5) Твердость по Бринеллю		(6) Твердость по Роквеллу		(7) Назначение и условный диаметр $d$ , мм	(8) Марка стали	(9) Номер стандарта
	наим.	наим. (справ.)	наим.	наим. (справ.)		наим.	наим. (справ.)	наим.	наим. (справ.)			
3.6	34	49	20	25	Не регламентируется	90	150	48	80	Не регламентируется	Cr3cn3, Cr3cn3 10	ГОСТ 380-71 ГОСТ 1050-60, ГОСТ 10702-63
	30										10 кн	ГОСТ 1050-60, ГОСТ 10702-63
4.6			24	25	5,5						20	ГОСТ 1050-60, ГОСТ 10702-63
4.8	40	55	22	14 справ.	Не регламентируется	110	170	62	85		0,10 кн	ГОСТ 1050-60, ГОСТ 10702-63
5.6			30	20	5						30, 35	ГОСТ 1050-60, ГОСТ 10702-63
5.8	50	70	40	10 справ.	Не регламентируется	140	215	77	87		16**, 10кн**, 20, 30кн Cr3cn3, Cr3cn3.	ГОСТ 1050-60, ГОСТ 10702-63, ГОСТ 10702-63, ГОСТ 380-71
6.8			36	16	4						35, 45 40Г	ГОСТ 1050-60, ГОСТ 10702-63 ГОСТ 4543-71
6.8*	60	80	48	8 справ.	Не регламентируется	170	245	88	102		43,7	ГОСТ 10702-63, ГОСТ 1050-60
6.8			54	12 справ.							47,5	
8.8	80	100	64	12*	6	225	300				36***, 35X, 30XA 45Г	ГОСТ 10702-63, ГОСТ 1050-60 ГОСТ 4543-71
10.9	100	130	90	8	4	360	455			21 33	40Г2, 40X, 30XГСА, 16 XCH	ГОСТ 4543-71, ГОСТ 10702-63
12.9	120	140	100	8	4	370	475			29 39	35XГСА	ГОСТ 4543-71
14.9	140	160	120	7	3	390	490			36 46	40XHMA	ГОСТ 4543-71
										41 50		

Key: (1) Strength class\*; (2) Tensile strength  $\sigma_B$ , kgf/mm<sup>2</sup>; (3) least; (4) greatest ( ? ); (5) Yield point  $\sigma_T$ , kgf/mm<sup>2</sup>; (6) Rel. elongation  $\delta_5$ , %; (7) Impact toughness  $a_{H5}$ , kgf/cm<sup>2</sup>; (8) no less than; (9) Brinell hardness HB; (10) Rockwell hardness; (11) HRB; (12) HRC; (13) Stress from test load  $\sigma_n$ , kgf/mm<sup>2</sup>; (14) Brand of steel; (15) Number of standard; (16) Not fixed; (17) ? .

\* The strength class is designated by two numbers. The first number, multiplied by 10 determines the magnitude of the minimum tensile strength in kgf/mm<sup>2</sup>, the second number, multiplied by 10, determines the ratio of yield point to tensile strength in percentages; the product of the numbers determines the magnitude of yield point in kgf/mm<sup>2</sup> (for the strength class of 3.6 the values are approximate).

\*\* For bolts, screws and studs with a thread diameter up to 12 mm inclusive.

\*\*\* For bolts, screws and studs with a thread diameter up to 16 mm inclusive.

## Notes:

1. It is permitted to use free-cutting steel in the manufacturing of parts of strength classes 4.8, 5.8 and 6.8.

2. In the supplying of bolts, screws and studs it is permitted to replace parts of lower strength classes by parts of higher strength classes:

strength class 3.6 by 4.6;  
 strength class 4.8 by 5.8, 6.8, 6.9;  
 strength class 5.8 by 6.8, 6.9;  
 strength class 6.8 by 6.9, 8.8;  
 strength class 6.9 by 8.8.

Table 2

Mechanical properties of nuts made from carbon and alloy steels at normal temperature

① Класс прочности*	② Напряжение от испытательной нагрузки $\sigma_F$ , кгс/мм <sup>2</sup> , не менее	③ Твердость по Бринеллю HB ⑥ не более	④ Твердость по Роквеллу HRC	⑤ Марки стали	⑦ Номер стандарта
4	40	302	33	Ст3кп3, Ст3сп3	ГОСТ 380-71
5	50			10, 10кп, 20	ГОСТ 10702-63, ГОСТ 1050-60
6	60			10, 10кп, 15, 15кп, 35 Ст5	ГОСТ 10702-63, ГОСТ 1050-60 ГОСТ 380-71
8	80			20, 20кп 35, 45	ГОСТ 10702-63 ГОСТ 1050-60
10	100	353	38	35X, 38XA	ГОСТ 4543-71
12	120			40X, 30XГСА, 16XCH	ГОСТ 4543-71
14	140			35XГСА, 40XHMA	ГОСТ 4543-71

Key: (1) Strength class\*; (2) Stress from test load  $\sigma_F$ , kgf/mm<sup>2</sup> no less than; (3) Brinell hardness HB; (4) Rockwell hardness HRC; (5) no more than; (6) Brands of steel; (7) Number of standard.

\* Strength class is designated by a number, which when multiplied by 10 gives the magnitude of stress from a test load in kgf/mm<sup>2</sup>.

## Notes:

1. It is permitted to use phosphorous steel in the manufacture of nuts of strength classes 4 and 5, and free-cutting steel for strength classes 4, 5 and 6.



2. In the supplying of nuts it is permitted to replace nuts of lower strength classes by nuts of higher strength classes (if prohibition of replacement is not stipulated in the order). Here the hardness of the nuts being supplied should not exceed the values indicated for the class being replaced.

(Changed wording - "Inform. index of standards" No 3, 1972).

1.3. The recommended technological processes for the manufacturing of bolts, screws and studs are given in appendix 1, and for nuts - in appendix 2.

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1.4. Based on the user requirement stipulated in the order, it is not permitted to use rimmed and free-cutting steels for the manufacture of bolts, screws and studs.

1.5. The mechanical properties of bolts, screws, studs and nuts, manufactured from noncorroding, heat-resistant, oxidation-resistant and heatproof steels, and also brands of steel should correspond to those indicated in tables 3 and 4.

Table 3

Mechanical properties of bolts, screws and studs made from non-corroding, heat-resistant, oxidation-resistant and heatproof steels at normal temperature

① Условное обозначение групп	Временное сопротивление $\sigma_B$ , кгс/мм <sup>2</sup>	Предел текучести $\sigma_T$ ( $\sigma_{0.2}$ ), кгс/мм <sup>2</sup>	Относительное удлинение $\delta_5$ , %	Ударная вязкость $a_{H5}$ , кгс.м/см <sup>2</sup>	② Напряжение от пробной нагрузки $\sigma_n$ , кгс/мм <sup>2</sup>	⑧ Марка стали	⑨ Номер стандарта
	не менее ④						
21	52	20	40	—	18,0	X18H10T, X18H9T, X17H13M2T	ГОСТ 5632-61
22	70	55	15	6	49,5	2X13	ГОСТ 5632-61
23		65	12	6	58,5	1X17H2	ГОСТ 5632-61
24	90	55	8	3	49,5	X12H22T3MP	ГОСТ 5632-61
25		75	10	3	67,5	1X12H2BMФ, 25X1MФ, 25X2M1Ф, 20X1M1Ф1TP*	ГОСТ 5632-61 ГОСТ 10500-63
26	110	85	10	5	78,5	X16H6*	—

Key: (1) Conditional designation of group; (2) Tensile strength  $\sigma_B$ , kgf/mm<sup>2</sup>; (3) Yield point  $\sigma_T$  ( $\sigma_{0.2}$ ), kgf/mm<sup>2</sup>; (4) Relative elongation  $\delta_5$ , %; (5) Impact toughness  $a_{H5}$ , kgf/cm<sup>2</sup>; (7) Stress from test load  $\sigma_n$ , kgf/mm<sup>2</sup>; (8) Brands of steel; (9) Number of standard.

\* Based on technical conditions, approved in established order.



Table 4

Mechanical properties of nuts made from noncorroding, heat-resistant, oxidation-resistant and heatproof steels at normal temperature

① Условное обозначение группы	② Напряжение от испыта- тельной наг- рузки $\sigma_p$ , кгс/мм <sup>2</sup> не менее	③ Марка стали	④ Номер стандарта
21	52	X18H10T, X18H9T, X17H13M2T	ГОСТ 5632-61
22	70	2X13	ГОСТ 5632-61
23		1X17H2	ГОСТ 5632-61
25	90	X12H22T3MP, 1X12H2BMΦ	ГОСТ 5632-61
		25X1MΦ, 26X2M1Φ	ГОСТ 10500-63
		20X1M1Φ11P*	—
26	110	X16H6*	—

Key: (1) Conditional designation of group; (2) Stress from test load  $\sigma_p$  kgf/mm<sup>2</sup>, no less than; (3) Brand of steel; (4) Number of standard.

\* Based on technical conditions, approved in established order.

(Changed wording - "Inform. index of standards" No 3, 1972).

1.6. The mechanical properties of bolts, screws, studs and nuts, manufactured from nonferrous alloys, and also brands of material should conform to those indicated in tables 5 and 6.

1.7. The brand of material used for the manufacture of bolts, screws and studs of strength classes 8.8, 10.9 and of nuts of strength classes 10, 12 and 14, should be indicated in the order from those stipulated in tables 1 and 2.

1.8. The brand of carbon steel used for the manufacture of bolts, screws and studs of strength classes 3.6-6.9 and of nuts of strength classes 4-8, and also the brand of the nonferrous alloy are selected by the manufacturer from those stipulated in tables 1, 2, 5 and 6.

1.9. On agreement between the consumer and the manufacturer it is permitted for the manufacture of bolts, screws, studs and nuts out of carbon and alloy steels to use brands of material which are not indicated in tables 1 and 2, but which ensure the obtaining of parts with the mechanical properties of the corresponding strength classes, and also to manufacture bolts, screws, studs and nuts out of nonferrous alloys which are not indicated in tables 5 and 6. In this case the mechanical properties can differ from those stipulated in tables 5 and 6.

Table 5

Mechanical properties of bolts, screws and studs made from non-ferrous alloys at normal temperature

Условное обозначение группы (1)	Временное сопротивление $\sigma_B$ в кгс/мм <sup>2</sup> (2)	Предел текучести $\sigma_T$ ( $\sigma_{0.2}$ ) в кгс/мм <sup>2</sup> (3)	Относительное удлинение $\delta_5$ % (4)	Твердость по Бринеллю HB (5)	Марка материала или сплава (6)	Номер стандарта (7)
			не менее (8)			
31	27	12	15	(9) Не регламентируется	АМг5П	ГОСТ 4784-65
32					(10) Латунь ЛС59-1, латунь Л63	
33	32	(9) Не регламентируется	12	75	(11) Латунь ЛС60-1, латунь Л63 антимагнитные	ГОСТ 15527-70
34	50			(9) Не регламентируется	(12) Бронза Бр. АМц9-2	ГОСТ 493-54
35	38	20	10		Д1П, Д16П	ГОСТ 4784-65

Key: (1) Conditional designation of group; (2) Tensile strength  $\sigma_B$ , kgf/mm<sup>2</sup>; (3) Yield point  $\sigma_T$  ( $\sigma_{0.2}$ ), kgf/mm<sup>2</sup>; (4) Relative elongation  $\delta_5$ , %; (5) Brinell hardness HB; (6) Brand of material or alloy; (7) Number of standard; (8) no less than; (9) Not fixed; (10) Brass LS59-1, brass L63; (11) Brass LS59-1, brass L63 antimagnetic; (12) Bronze Br. AMts9-2.

Table 6

Mechanical properties of nuts made out of nonferrous alloys at normal temperature

① Условное обозначение группы	② Напряжение от испытательной нагрузки $\sigma_F$ , кгс/мм <sup>2</sup> , не менее	③ Марка материала или сплав	④ Номер стандарта
31	27	АМг5П	ГОСТ 4784-65
32	32	⑤ Латунь ЛС59-1, латунь Л63	ГОСТ 15527-70
33		⑥ Латунь ЛС59-1, латунь Л63 антимаг- нитные	
34	50	⑦ Бронза Бр. АМц0-2	ГОСТ 403-54
35	38	Д1П, Д10П	ГОСТ 4784-65

Key: (1) Conditional designation of group; (2) Stress from test load  $\sigma_F$ , kgf/mm<sup>2</sup>, no less than; (3) Brand of material or alloy; (4) Number of standard; (5) Brass LS59-1, brass L63; (6) Brass LS59-1, brass L63 antimagnetic; (7) Bronze Br. AMts9-2.

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(Changed wording - "Inform. index of standards" No 3 1972).

1.10. The brand of the material for the manufacture of parts of groups 21, 23, and 25 should be indicated in the order. It is permitted to order parts made out of brands of material which are not indicated in tables 3 and 4. In this case the mechanical properties can differ from those stipulated in these tables.

1.11. On request of the consumer, fastening parts made out of brass, manufactured by cold heading, should be subjected to heat treatment for the removal of internal stresses.

1.12. On request of the consumer, bolts, screws, studs and nuts should be produced with a coating.\*

The types and conditional designations of coatings should conform to those indicated in table 7.

\* Up until 1/1 1973 the manufacture of bolts, screws, studs and nuts with coatings has been carried out on agreement of the parties.

Table 7

Designation	Type of coatings
00	Without a coating
01	Zinc with chromizing
02	Cadmium
03	Nickel
03	Multilayer - copper-nickel
04	Multilayer - copper-nickel-chromium
05	Oxide
06	Phosphate with oiling
07	Tin
08	Copper
09	Zinc
10	Oxide anodizing with chromizing
11	Passive
12	Silver

The selection of the type of coating for a specific material is made in accordance with GOST 14623-69. The selection of coating thickness is in accordance with GOST 9791-68.

(Changed wording - "Inform. index of standards" No 3 1972).

1.13. The technical requirements for coatings, the thicknesses of coatings and the dimensions of the thread under the coating are established by agreement between the consumer and the manufacturer.

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1.14. By agreement between the manufacturer and the consumer it is permitted to use other types of coatings.

1.15. The dimensions of thread run-out, undercuts (underfills) and bevel edges on the end of the thread of bolts, screws and studs are in accordance with GOST 10549-63.

1.16. By agreement between the customer and the manufacture it is permitted to produce:

- a) bolts, screws and studs with an elongated or shortened length of the threaded part;
- b) studs and nuts with a left-hand twist;
- c) bolts with one opening in the head.

1.17. Deviations from the correct geometric form and defects in the external form are stipulated in tables 8 and 9.



Table 8

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

1. Cracks.
2. Grooves, bringing the dimensions of parts out beyond the limiting deviations.
3. A bevel edge on the supporting surface of bolts at an angle greater than  $15^\circ$  (drawing 1b).
4. Blunting of the edges of the hexagon or square to the seat of the bolt by more than 0.25 of the height of the head of the bolt or nut (drawing 1a).

a) with heading

b) with turning



S - dimension "for a wrench"

Drawing 1.

5. Rounding off of the edges of the hexagon or square, bringing the diameter of the described circumference beyond the maximum deviation.

6. Rounding off of the shoulder of heads on bolts and screws with flat countersunk and raised countersunk heads and edges for bolts and screws with a button head, bringing the diameter of these heads beyond the maximum deviation.

7. Undermolding in the form of a cut in the top of a button head, if the diameter of the area of the cut exceeds:

40% of the nominal diameter of head

30% of nominal  
diameter of head

Undermolding should not bring the height of the head beyond the maximum limit.

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

8. A pitch of the generatrix of the head (drawing 2) of more than  $5^\circ$  and a sphere on the upper face of the head, bringing the height of a cylindrical head beyond the maximum deviation



Drawing 2.

9. A reduction in the rated diameter of the head in the direction of the slot, exceeding:

0.3 mm - for screws with a thread diameter up to 2 mm inclusive;

0.6 mm - for screws with a thread diameter from 2.5 to 5 mm inclusive;

0.7 mm - for screws with a thread diameter from 6 mm and higher.

10. Slope of face (angle  $\beta$  - figure 3) no more than:

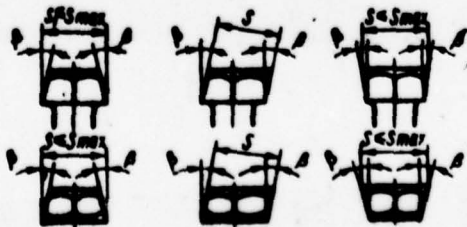
$2^\circ$

$2^\circ$

$1^\circ$

Notes:

1. The slope of the faces should not bring the dimensions "for a wrench" beyond the maximum deviations.



Drawing 3.

Table 8 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

2. The requirements of note 1 do not extend to coarse precision bolts produced on friction presses.

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11. A slope of the faces of the inner hexagon (angle  $\beta$  - drawing 4) greater than:

5° | 3°



Drawing 4.

12. Cuts (chips) of metal on the faces of a head with a height of 0.25 more than the height of the head extending the dimensions "under the wrench" beyond the limits of 0.9 of the nominal dimension	Cuts (chips) of metal on the faces of a head with a height 0.2 more than the height of the head, extending the dimension "under the wrench" beyond the limits of 0.95 of the nominal dimension	Cuts (chips) of metal on the faces of a head with a height 0.15 more than the height of the head, extending the dimension "under the wrench" beyond the maximum deviation
---	--	---

13. Deviation from the perpendicularity of the surface of the head (angle  $\gamma$  - drawing 5) relative to the axis of the rod greater than:

2° - for parts with a thread diameter up to 30 mm inclusive;	1° - for parts with a thread diameter up to 30 mm inclusive;
1° - for parts with a thread diameter greater than 30 mm	30' - for parts with a thread diameter greater than 30 mm

Table 8 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

14. Deviation from perpendicularity of the seat of the nuts (angle  $\gamma$  - drawing 5) relative to the axis of the threads more than:

$2^{\circ}$		$1^{\circ}30'$		$1^{\circ}$
-------------	--	----------------	--	-------------



Drawing 5.

12

15. Convexity of seats.

16. Concavity of seats with a magnitude greater than half of the tolerance for the height of the head or the height of the nut.

17. Seams at the site of the mold parting line, increasing the actual diameter of the rod by more than a magnitude of tolerances of the 7th class of precision		Seams at the site of the mold parting line, increasing the actual diameter of the rod by more than a magnitude of tolerances of the 5th class of precision
--	--	--

18. Tracks from rollers or cutting tools, extending the diameter of the rod or the head beyond the maximum deviations.

19. Thickening of the diameter of the rod under the head of bolts and screws more than:

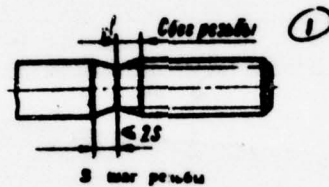
tolerances of the 7th class of precision on the length of two nominal diameters of the thread		0.05 mm on a length of 5 mm - for parts with a thread diameter up to 16 mm inclusive; 0.1 mm on a length of 8 mm - for parts with a thread diameter from 18 to 27 mm inclusive; 0.2 mm on a length of 10 mm - for parts with a thread diameter greater than 30 mm.
---	--	--



Table 8 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

20. For the rod of a thread which has been reduced under rolling - a smooth conical part between the end of the run-out and the thread-free part of the rod (drawing 6) with a length no greater than two pitches of thread

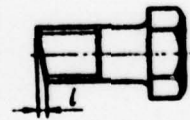


S thread pitch

Drawing 6.

Key: (1) thread run-out.

21. Scarf of rod (1) no more than:  
 magnitude of bevel edge c according to GOST 10549-63 | magnitude of 1/2 of bevel edge c according to GOST 10549-63



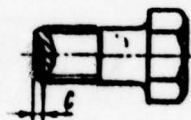
Drawing 7.

Table 8 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		

13

22. Hollow on the face of the rod of a rolled part with a depth greater than the dimension of the bevel edge  $c$  (drawing 8) according to GOST 10549-63



Drawing 8.

23. Burrs and sharp edges in the openings for the cotter pins.

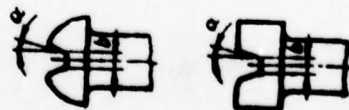
24. Countersinking of the openings for the cotter pins with a diameter greater than 1.5 the diameter of the opening or causing a break of the face.

25. Dents and splashes of metal on the base of the slot, extending its depth beyond the maximum deflection.

26. Slanting of the walls of the slot (angle  $\alpha$  - drawing 9) greater than:

5°

3°



b - width of slot

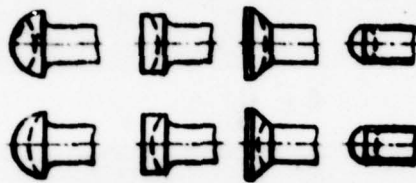
Drawing 9.

27. Burrs from the slot groove.

28. Concavity of the bottom of the slot with a curvature, not corresponding to the radius of the standard slot or grooving cutter, and also a convexity with a radius less than 90 mm - for screws with a thread diameter down to 12 mm and less, and 150 mm - for screws with a thread diameter greater than 12 mm (drawing 10)

Table 8 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Not permitted:		



Drawing 10.

14

29. Dents and splashes on the end surface of the head of cross-slotted screws at the point of upsetting of the slot, bringing the height of the head beyond the maximum deviation.

30. Burrs and dents on the thread, preventing the threading of a go-gage.

31. Fissures and chipping of the screw thread of rod parts, if in depth they go beyond the limits of the mean diameter of the thread or their length exceeds:

8% of the overall length of the thread on the screw line, and in one turn $1/3$ of its length	5% of the overall length of the thread on the screw line, and in one turn $1/4$ of its length	2% of the overall length of the thread on the screw line, and in one turn $1/6$ of its length
---	---	---

32. Fissures and chipping of the screw thread of nuts, if in depth they go beyond the limits of the mean diameter of the thread or the length exceeds half a turn.

33. A reduction in the height of the thread profile of rod parts with a reduction of the outer diameter of the thread by more than:

three end turns	two end turns
-----------------	---------------

34. Rounding of the apex of the profile of a rolled thread, bringing the outer diameter of the thread beyond the maximum deviation.

35. Shifting of the axis of the thread relative to the axis of the shank of the rod, exceeding the field of tolerance:

of the 7th class of precision	of the 5th class
-------------------------------	------------------

The base dimension for calculation of tolerance is the outer diameter of the thread

Table 9

Degree of precision of parts		
Coarse	Normal	Higher
Are permitted:		

1. Surface defects, anticipated by the technical requirements for the wire and bars from which the parts are fabricated.

2. Local charring of surface, traces of clamps, traces from feed mechanisms, traces of laps, un-separated scale and rust which is easily washed off with kerosene	Traces of clamps from feeding mechanisms, traces of laps, un-separated scale and rust which is easily separated with on parts which are supplied without a coating	Traces from the mold parting line
---	--	-----------------------------------

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3. Centering opening on the face part of the head and the rod.

4. Reduction of height of thread profile with an increase in the inner diameter of the thread in the last turn of the thread of a nut.

5. Bevel edge at an angle of  $90^\circ$  in the openings of nuts which have coatings.

6. Insignificant flakes on the edges of recesses in the heads of bolts and the edges of the inner hexahedron, not going beyond the faces.

7. Insignificant burrs, easily removed by tightening, seams from the mold parting line and a step on the bearing surface of the heads with a height no greater than:

0.3 mm

0.2 mm

Traces from trimming of burrs and seams and insignificant burrs in the limits of the height of the bearing disk.

8. Insignificant flakes and pressed splashes of metal on the support surfaces of nuts in the points of contact with the outer and inner beveled edges

Insignificant splashes of metal on the support surfaces of nuts.



Table 9 (continued)

Degree of precision of parts		
Coarse	Normal	Higher
Are permitted		

9. Passing from the neck to the rod of bolts at an angle of  $60^\circ$ .
10. Absence of the end bevel edge on the rods of rolled parts | On agreement between the consumer and the producer - absence of an end bevel edge on the rods of rolled parts \*
11. Reduction of thread profile at the opening for the slot.
12. corners of a square neck.
13. Rounding of the upper face of the head in place of the bevel edge in bolts with a recess in the head.

\* Until 1/1 1975 it is permitted to produce a thread without an end beveled edge, if the rolling method is used.

(Changed wording - "Inform. index of standards, No 3, 1972).

1.18. Prepared bolts, screws, studs and nuts should be admitted for technical testing of the enterprise-manufacturer. The manufacturer should guarantee that the parts produced correspond to the requirements of this standard.

## List of the types of tests for bolts, screws and studs

Виды испытаний	(2) Мат. разн.										(3) Аустенитные, мартенситные, ферритные и бейнитные стали										(4) Нержавеющие											
	(1) Углеродистые и легированные										(5) Класс прочности										(6) Условные обозначения групп											
	30	40	45	50	55	60	65	70	80	100	12.9	14.9	15.7	17.7	19.9	20.9	22.9	24.9	26.9	28.9	30.9	31.9	32.9	33.9	34.9	35.9	36.9	37.9	38.9	39.9	40.9	
1. Испытание на разрыв (п. 2.18)	T	T	T	T	T	T	T	T	O	O	O	O	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
2. Измерение твердости (п. 2.19)	T	T	-	T	-	T	-	-	T	T	T	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Испытание на растяжение образцов (п. 2.20)	T	T	T*	T	T*	T	T*	T*	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
4. Определение ударной вязкости (п. 2.21)	-	T	-	T	-	T	-	-	O	O	O	O	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
5. Испытание пробной нагрузкой (п. 2.22)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
6. Испытание на прочность соединения головки со стержнем (п. 2.23)	-	-	O	-	O	-	O	O	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7. Испытание на разрыв наискосок (п. 2.24)	T	T	-	T	-	T	-	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
8. Измерение величины обезуглероживающего слоя (п. 2.25)	-	-	-	-	-	-	-	-	T	T	T	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9. Испытание на долговечную прочность (п. 2.26)	-	-	-	-	-	-	-	-	-	-	-	-	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	

Key: (1) Types of tests; (2) Material; (3) Carbon and alloy steels; (4) Strength class; (5) Noncorroding, heat-resistant, oxidation-resistant and heatproof steels; (6) Nonferrous alloys; (7) Conditional designation of group; Numbered tests in column 1: 1. Tensile test (p.2.18); 2. Measurement of hardness (p.2.19); 3. Tensile test of samples (p.2.20); 4. Determination of impact toughness (p.2.21); 5. Testing of check load (p.2.22); 6. Testing for strength of connection of head with the bar (p.2.23); 7. Tensile test on a slanted washer (p.2.24); 8. Measurement of the magnitude of the decarbonized layer (p.2.25); 9. Stress-rupture test (p.2.26):

O - compulsory tests; T - tests on request of the consumer;  
C - tests on agreement between the consumer and the manufacturer.  
\* Only for determination of tensile strength and relative elongation.  
\*\* Only for determination of tensile strength and yield point.

## Notes:

1. In the manufacturing of bolts, screws, and studs by the cutting method without subsequent heat treatment it is permitted to conduct the testing of mechanical properties according to points 2, 3, 4 on the initial metal or on samples which were turned from it.
2. If testing according to point 7 is conducted, then testing on point 1 is not conducted.
3. If testing according to point 3 is conducted, then testing on point 5 is not conducted.

## 2. Test Methods

2.1. Bolts, screws, studs and nuts should be subjected to the tests indicated in tables 10 and 11.

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Table 11

List of the types of tests for nuts

① Виды испытаний	② Материал															
	③ Углеродистые и легированные стали							④ Коррозионно-стойкие, жаропрочные, жаростойкие и теплоустойчивые стали				⑤ Цветные сплавы				
	⑥ Класс прочности							⑦ Условное обозначение группы								
	4	5	6	8	10	12	14	21	23	25	26	31	32	33	34	35
1. Контроль на испытательную нагрузку (п. 2.27)	Т	Т	Т	Т	О	О	О	Т	Т	Т	Т	Т	Т	Т	Т	Т
2. Измерение твердости (п. 2.19)	Т	Т	Т	Т	Т	Т	Т	—	—	—	—	—	—	—	—	—

Key: (1) Types of tests; (2) Material; (3) Carbon and alloy steels; (4) Noncorroding, heat-resistant, oxidation-resistant and heatproof steels; (5) Nonferrous alloys; (6) Strength class; (7) Conditional designation of group.

1. Check for test load (p.2.27); 2. Measurement of hardness (p.2.27).

O - compulsory tests; T - tests on request of consumer.

(Changed wording - "Inform. index of standards" No 3 1972).

2.2. Inspection of parts should be done without the use of magnification devices.

Surface roughness should be checked by means of a comparison with standard samples.

### Notes:

1. It is permitted to check for the presence of cracks by special methods, surface roughness - by instruments.

2. In disputable cases it is permitted to use a magnifier with a 2.5-3-fold amplification.

2.3. The measurements of parts should be checked with difference gages, templates, universal measuring instruments, control dies, etc.

2.4. The thread should be checked with difference gages. For bolts and studs with openings for cotter pins it is permitted to screw on a no-go thread gage until the complete passage of the opening.

2.5. The thickness of a coating layer should be checked on the head of the bolts and screws, on the faces or ends of nuts, on the rod of stud bolts.

The methods of checking the quality and thickness of coatings is GOST 16875-71. The selection of the method of checking the thickness of coatings is at the discretion of the manufacturer.

2.6. The perpendicularity of the seat of the head of a bolt or screw to the axis of the rod should be measured with an angle template or probe based on the clearance between the seat of the head and the end surface of a control matrix. The opening in the matrix should be made according to the 1st series of GOST 11284-65 for bolts and screws of increased normal precision and according to the 2nd series for rough precision.

The perpendicularity of the seat of a nut to the axis of the thread should be checked with a probe based on the gap between the end surfaces of the nut and a control ring, screwed on until contact between them on a threaded bar.

It is permitted to check the perpendicularity of the seat of parts by control of the end play.

2.7. The rectilinearity of the rod of bolts, screws and studs should be checked based on the free entering of the rod into a control matrix. The opening in the matrix should be made according to the 1st series of GOST 11284 - 65 for bolts, screws and studs of increased and normal precision and according to the 2nd series for bolts of rough precision. The depth of the opening in the matrix should be no less than the length of the part being checked.

(Changed wording - "Inform. index of standards" No 3 1972).

2.8. The slant of the faces of the head should be checked with an angle gage.

2.9. Blunting of the corners of a square neck should be checked in a control sleeve or template, made according to the 2nd series of GOST 11284-65. There should be installed under the head of the bolt a plane washer with an opening with a diameter greater than the diameter of the described circumference of the neck and a thickness no less than 0.5 of the height of the neck.

Turning of the neck in the opening of the control sleeve or template is not permitted.

(Changed wording - "Inform. index of standards" No 3 1972).

2.10. The length of the bolt, screw and stud, if the section of the rod is sloping, should be checked on its long side.

2.11. The depth of a straight slot should be checked on the axis of the rod.



2.12. The location of the slots of castellated and slotted nuts should be checked with a gage, the thread of which is made according to the dimensions of a threaded go-gage of the nut being checked, and the diameter of the pin is equal to the diameter of the cotter pin (drawing 11).



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Drawing 11.

The form of the base of the slot is not checked.

2.13. Cross-shaped slots should be checked according to GOST 10753-64.

2.14. Checking of the diameter of the described circumference of hexagonal nuts, bolts and screws with hexagonal or square heads should be done in the middle part of the height of the nut or the head of the bolt on a sector, equal to half of their height.

2.15. The roughness of the thread should be checked on the lateral surfaces of the profile.

(Changed wording - "Inform. index of standards" No 3, 1972).

2.16. The roughness of the face of rods, except for setting screws, is not checked.

2.17. Dimensions which are not limited by maximum deviations are not checked. Their fulfillment should be guaranteed by the technological process of production.

2.18. Tensile testing of bolts, screws and studs should be done on a tensile impact testing machine. Here the tensile strength should be no lower than that indicated in tables 1, 3, 5. Subject to testing are parts with a thread diameter of 4 mm and more, with a rod length equal to or greater than double the diameter of the thread, but less than 40 mm. Parts for which the required breaking load exceeds 50 t are tested by agreement between the manufacturer and the consumer.

Bolts, screws or studs should be tested with a nut screwed on (or some other attachment which has the corresponding threaded opening); rupture should occur in the rod or in the thread without break-off of the head. The height of the nut which is screwed on should be no less than 0.8 of the nominal diameter of the thread. For bolts, screws and studs, the dimensions of which do not make it possible to test them for tensile strength, the hardness should be measured.

Notes:

1. In the case of rupture of the bolt, screw or stud on the thread the tensile strength should be calculated by using the area of a cross section of a circle with a diameter, equal to

$$\frac{d_1 + d_2}{2}$$

where:

$d_2$  - nominal mean diameter of thread;

$$d_3 = d_1 - \frac{H}{6},$$

where:

$d_1$  - nominal inner diameter of thread;

H - theoretical height of profile.

2. A section of thread with a fine pitch is not a defective sign in the case of loads which exceed calculated, obtained from the formula:

$$P = \sigma_{\text{min}} \cdot \frac{\pi}{4} \left( \frac{d_1 + d_2}{2} \right)^2$$

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where  $\sigma_{\text{B min}}$  - minimum value of tensile strength according to tables 1, 3, 5.

2.19. Hardness should be determined according to GOST 9012-59 or GOST 9013-59. In this case the hardness numbers should be found within the limits indicated in tables 1, 2, 5.

The hardness of bolts and screws should be checked on the head, of studs - on the smooth part, and of nuts - on the end surface or faces. The method for measuring hardness is selected by the manufacturer.

Note. The hardness of bolts and screws which are produced by the method of cold heading without heat treatment should be measured on the end or on the smooth part of the rod.

2.20. Tensile tests of samples should be conducted on a tensile impact testing machine. The samples subjected to testing are made from bolts, screws and studs with a thread diameter of 4 mm and greater, with a length no less than eight times the diameter of the thread, but no less than 100 mm (drawing 12).



Drawing 12.

$d$  - outer diameter of thread;  $b$  - thickness of grip section;  $d_0$  - no greater than the inner diameter of the thread;  $l_0 \geq d_0$ ;  $l_v = l_0 + d_0$ ;  $l_t = l_v + 2r + b$ ;  $r \geq 4$  mm.

In the production of test samples of bolts, screws and studs with a thread diameter greater than 16 mm with mechanical properties of strength classes 8.8, 10.9, 12.9, 14.9 and groups 24, 25, 26 a reduction of rod diameter by no more than 25% is permitted.

The test sample is loaded to rupture, and in this case the tensile strength, yield point (or conditional yield point) and relative elongation should be no lower than indicated in tables 1, 3 and 5. Samples for which the required breaking load exceeds 50 t are tested by agreement with the manufacturer and consumer.

The method for determining the yield point and relative elongation is in GOST 1497-61.

2.21. Impact toughness should be checked on samples of bolts, screws and studs with a thread diameter of 16 mm and more. The values of impact toughness should be no lower than those indicated in tables 1 and 3. The remaining requirements - according to GOST 9454-60.

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Note. Bolts, screws and studs, in which the length of the thread-free part of the rod is less than 55 mm, are tested with a thread diameter of 18 mm and more.

2.22. Testing of the test load should be carried out on a tensile impact testing machine. Here the residual elongation should not exceed 12  $\mu$ m. The bolts, screws and studs which are subjected to testing are those with a thread diameter of 4 mm and more, with a length, equal to or greater than four times the diameter of the thread. Parts, for which the required magnitude of test load exceeds 50 t, are tested on agreement of the parties.

The part is subjected to a test load, the magnitude of which is calculated by the formula:

$$P_n = \sigma_n \cdot \frac{\pi}{4} \left( \frac{d_2 + d_1}{2} \right)^2,$$

where:

$\sigma_n$  - stress from test load according to tables 1 and 3;

$d_2$  - nominal mean diameter of thread;

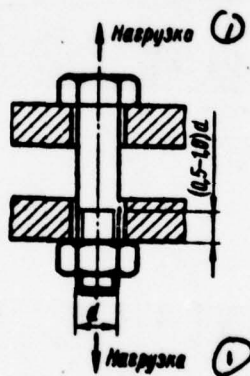
$$d_2 = d_1 + \frac{H}{6},$$

where:

$d_1$  - nominal inner diameter of thread,

$H$  - theoretical height of profile.

The length of the loaded threaded section of the part should comprise 0.5-1.0 of the nominal diameter of the thread (drawing 13).



Drawing 13.

Key: (1) Load.

The thread height of the nut or other attachment which serves for the transmission of force should comprise 0.8 of the nominal diameter of the thread. For determining the residual elongation before and after testing the length of the part is measured with the help of a measuring device equipped with measuring balls.

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The error of the measuring device should be no greater than  $\pm 2 \mu\text{m}$ . For measurements on the faces of bolts, screws and studs centering openings with a taper of  $60^\circ$  are bored out. During measuring the possibility of thermal elongation of the part should be excluded. Other methods of measuring length are permitted.

Note. The magnitudes of test load are given in appendix 3.



(Changed wording - "Inform. index of standards" No 3, 1972).

2.23. Testing of the strength of connection of the head with the rod should be done by impacts on the head of the bolt or screw up until contact of the supporting surface of the head with the plane of the matrix (drawing 14). Here at the site of transition of the head to the rod there should be no strains or cracks. Bolts and screws with a thread diameter up to 16 mm inclusive are subjected to testing. The opening in the matrix should be beveled at  $75^\circ$ . The dimensions of the opening of the matrix should correspond to those stipulated in GOST 11284-65 on the 1st series for bolts and screws of higher precision and on the 2nd series for bolts and screws of normal precision and bolts of rough precision.



Drawing 14.

Notes:

1. Bolts and screws with countersunk and half countersunk heads are not subjected to the testing.
2. In bolts and screws with thread up to the head cracks are permitted in the first turn of the thread from the head.

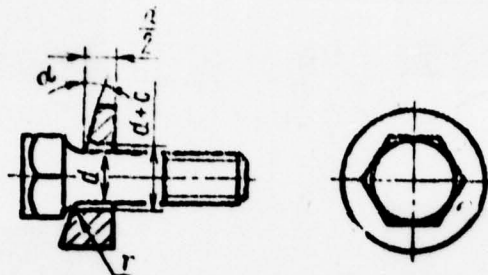
(Changed wording - "Inform. index of standards" No 3, 1972).

2.24. Tensile strength testing on a beveled washer should be carried out on a tensile impact testing machine. In this case rupture should not occur on the sector where the head is connected with the rod, and the values of tensile strength should be no lower than those stipulated in tables 1, 3 and 5. Subject to testing are bolts and screws with a thread diameter of 4 mm and more, with a rod length equal to or greater than four times the diameter of the thread, but no less than 40 mm. Parts for which the required breaking load exceeds 50 t are tested by agreement with the parties.

A hardened washer with the dimensions indicated in Table 12 is used for the testing. It is mounted in such a way that the head of the bolt or screw lies on the bevel of the washer.

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The distance from the beginning of thread run-out to the nut or to another attachment, which serves for the transfer of force, should be no less than the nominal diameter of the thread. The height of the nut or other attachment should be less than 0.8 of the nominal diameter of the thread.



Drawing 15.

Notes:

1. Bolts and screws with countersunk and half countersunk heads are not subject to testing.
2. For bolts and screws with thread up to the head cracks are permitted in the first turn of the thread from the head.

Table 12

① Номинальный диаметр ребра болта или винта d, мм	r, мм	с, мм	α (врсд. откл. ±30') ②			
			③ для болтов и винтов с резьбой не до головки		④ для болтов и винтов с резьбой до головки	
			⑤ для классов прочности с удлинением			
			10%	<10%	10%	<10%
<6	0,5	0,7	10°	6°	6°	4°
6—12	0,8	0,8	10°	6°	6°	4°
12—20	1,6	1,3	10°	6°	6°	4°
20—48	3,2	1,6	6°	4°	4°	4°

Key: (1) Nominal thread diameter of bolt or screw, d, mm;  
 (2) α (max. dev. +30'); (3) for bolts and screws without thread up to the head; (4) for bolts and screws with thread up to the head; (5) for classes of strength with elongation.

2.25. The depth of the decarbonized layer is measured on a microsection. In this case the overall magnitude of decarbonization should not exceed 1/3 the height of the nominal profile of the thread on the apex and 1/10 of the nominal profile of the thread in the root (drawing 16).

The samples are cut out of a bolt, screw and stud in a longitudinal direction, and the plane of the cross section should pass through the axis of the thread and the deviation from the radial direction should not exceed 1/10 of the nominal thread diameter.

For measuring, the average value out of four measurements on the apexes of the thread profile and the average value out of four measurements in the roots are taken.



Drawing 16.

Key: (1) Completely or partially decarbonized zone; (2) Non-decarbonized zone.

The remaining requirements - according to GOST 1763-68.

2.26. The method of testing for stress-rupture strength is by agreement between the consumer and the producer.

2.27. Checking of the nuts for test load should be carried out on a tensile-testing machine. In this case there should be no breakdown of the nut, shearing or breaking off of the thread of the nut when a load equal to  $P_F = \sigma_F \cdot F$  is achieved, where:

$\sigma_F$  - stress from test load according to tables 2, 4 and 6;

$F$  - area of cross section of bolt or mandrel based on the diameter

$$\frac{d_1 + d_2}{2};$$

where:

$d_2$  - nominal mean diameter of thread;

$$d_2 = d_1 - \frac{H}{6},$$

where:

$d_1$  - nominal inner diameter of thread;

$H$  - theoretical height of profile.

Nuts, for which the required test load exceeds 50 t, are tested by agreement between the producer and the consumer.

During testing the nut is screwed onto a hardened bolt or a hardened threaded mandrel, in which the thread is made according to the 2nd class of precision. The hardness of the bolt or mandrel should be no less than HRC 45. After testing the nut should

be unscrewed by hand easily.

Notes:

1. If during testing the thread of the bolt or mandrel is damaged, the test is considered invalid.

2. When unscrewing the nut it is permitted to use a spanner wrench, with which it is permitted to turn the nut no more than 1/2 a turn.

3. The test loads for nuts are given in appendix 4.

2.28. The mechanical properties of a part, the dimensions of which do not make it possible to test it in accordance with tables 10 and 11, should be guaranteed by the material and the technological process of production.

### 3. Marking and Packing

3.1. (Rescinded. - "Inform. index of standards" No 3 1972).

3.2. Bolts with a hexagonal head with a thread diameter  $\geq 5$  mm and studs with a thread diameter  $\geq 12$  mm should have the stamp of the producing enterprise and a marking which designates the strength class or a conditional designation of group according to tables 1-6.

The dimensions of the letters on the stamp and the marking are established by the producer.

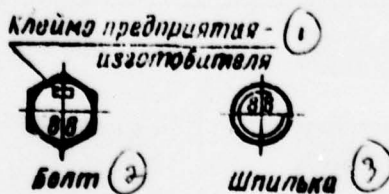
Note. Parts of strength classes 3.6, 4.6, 4.8, 5.6, 5.8, 6.6, 6.8 and 6.9, and also parts produced by the method of turning, are stamped and marked by agreement between the consumer and the producer.

(Changed wording - "Inform. index of standards" No 3 1972).

3.3. The stamping and marking of parts, not indicated in p. 3.3, is carried out by agreement with the consumer and the producer.

(Changed wording - "Inform. index of standards" No 3 1972).

3.4. The stamp of the enterprise and the marking signs should be applied on the head of the bolt and on the end of the female portion of the stud (drawing 17).



Drawing 17.

Key: (1) Stamp of producing enterprise; (2) Bolt; (3) Stud.



(Changed wording - "Inform. index of standards" No 3 1972).

3.5. The marking of bolts and studs can be raised or sunken.

In the case of raised marking it is permitted to have an increase in the maximum permissible height of the bolt head;  
for parts with a thread diameter up to 8 mm by 0.1 mm;  
for parts with a thread diameter in excess of 8 mm up to 12 mm by 0.2 mm;

for parts with a thread diameter in excess of 12 mm by 0.3 mm.

(Changed wording - "Inform. index of standards" No 3 1972).

3.6. The lettering of the marking should be clearly evident with the naked eye regardless of the quality of treatment of the surface of the part.

3.7. The marking on parts with a left-hand thread - according to GOST 2904-45.

3.8. The rules for acceptance, packing of parts, and marking of packaging - according to GOST 1471-54.

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#### Substitution

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GOST 16875-71 introduced in place of GOST 3003-58, GOST 3247-46 and GOST 3265-46.

Technological processes for the production of bolts, screws and studs out of carbon and alloy steels

(1) Класс прочности	(2) Марка стали	(3) Рекомендуемые технологические процессы изготовления
3.6	Ст3кп3, СтЗспЗ 10, 10кп	(4) 1. Горячая высадка 2. Холодная высадка с последующей смыкающей термообработкой
4.6	20	(5) Процесс 1 3. Холодная высадка с последующей нормализацией
4.8	10, 10 кп	(6) 4. Холодная высадка
5.6	30, 35	(7) Процессы 1 и 3
5.8	10, 10 кп. 20, 21 кп. СтЗкпЗ, СтЗспЗ	(8) Процесс 4
6.6	35	(9) 5. Горячая высадка с последующими закалкой и отпуском 6. Холодная высадка с последующими закалкой и отпуском
	45, 40 Г	(10) Процесс 1
6.8	20, 20 кп	(11) 7. Холодная высадка с редуцированием стержня
6.9		(12) Процессы 5 и 6 8. Точение с последующими закалкой и отпуском
8.8-14.9	(13) Сталь по табл. 1	

(Changed wording - "Inform. index of standards" No 3 1972).

Key: (1) Strength class; (2) Brand of steel; (3) Recommended technological processes of production; (4) 1. Hot heading. 2. Cold heading with subsequent thermoplastic treatment; (5) Process 1. 3. Cold heading with subsequent normalizing; (6) 4. Cold heading; (7) Processes 1 and 3; (8) Process 4; (9) 5. Hot heading with subsequent hardening and tempering; (10) Process 1; (11) 7. Cold heading with reduction of rod; (12) Processes 5 and 6. 8. Turning with subsequent hardening and tempering; (13) Steels according to Table 1.

Technological processes for the production of nuts out of carbon and alloy steels

(1) Класс прочности	(2) Марка стали	(3) Рекомендуемые технологические процессы изготовления
4	СтЗкпЗ СтЗспЗ	(4) 1. Горячая высадка или вырубка
5	10, 10кп	(5) 2. Холодная высадка
	20	(6) Процесс 1
6	С15, 35	(6) Процесс 1
	10, 10кп, 15, 15кп	(7) Процесс 2
	20, 20кп	(7) Процесс 2
8	45	(6) Процесс 1
	35	(8) 3. Горячая высадка с последующими закалкой и отпуском Процесс 2
10-14	Стали по табл. 2 (10)	(9) Процесс 3 (4) 4. Холодная высадка с последующими закалкой и отпуском 5. Точение с последующими закалкой и отпуском

(Changed wording - "Inform. index of standards" No 3 1972).

Key: (1) Strength class; (2) Brand of steel; (3) Recommended technological processes of production; (4) 1. Hot heading or punching out; (5) 2. Cold heading; (6) Process 1; (7) Process 2; (8) Hot heading with subsequent hardening and tempering; Process 2; (9) Process 3. 4. Cold heading with subsequent hardening and tempering. 5. Turning with subsequent hardening and tempering; (10) Steels according to Table 2.

## Test Loads for Bolts

Table 1

Coarse thread  
kgf

(1) Номинальный диаметр резьбы d, мм	1,0	2	3,0	4	5,5	6	8	10	12	14	16	18	20	22	24	27	30	36	42	48
	0,35	0,6	0,65	0,8	0,9	1,1	1,25	1,5	1,75	2	2,5	3,0	3,5	4,0	5,0	6,0	8,0	10,0	12,5	15,0
(2) Шаг резьбы S, мм	0,35	0,6	0,65	0,8	0,9	1,1	1,25	1,5	1,75	2	2,5	3,0	3,5	4,0	5,0	6,0	8,0	10,0	12,5	15,0
(3) Класс прочности и условное обозначение группы	3,6	23,9	38,9	63,7	84,6	127	168	267	378	690	1090	1580	2160	2850	3610	4610	5700	6650	8650	10500
	4,6	29,7	46,8	76,6	116	163	196	321	454	825	1310	1900	2600	3500	4360	5550	6850	8000	10100	12700
	5,8	37	60,2	98,6	144	197	255	413	585	1060	1690	2450	3350	4570	5600	7150	8900	10300	13400	16900
	6,6	43	70,2	115	170	230	296	481	680	1240	1970	2800	3900	5300	6200	8300	10300	12000	15600	19900
	8,8	55,5	90,5	145	220	298	384	620	880	1600	2500	3600	5050	6850	8400	10700	13200	15400	20100	25500
	9,8	60,3	98,3	161	239	322	417	675	955	1740	2750	4000	5500	7450	9100	11600	14400	16800	21800	28000
	10,9	67,9	110	187	291	395	510	825	1170	2190	3400	4900	6700	9100	12100	15900	19400	24000	30300	38600
	12,9	81	137	228	358	495	635	1030	1480	2800	4400	6400	8900	12000	16000	21000	26000	33000	42000	54000
	14,9	101	169	286	455	635	825	1350	1910	3600	5600	8200	11300	15000	19700	26000	33000	42000	54000	70000
	16,9	121	207	356	565	795	1045	1700	2420	4500	6900	10100	14000	18700	25000	33000	43000	56000	72000	94000
	18,9	141	247	436	695	975	1305	2050	2920	5400	8200	12200	17000	22700	30000	39000	51000	66000	86000	112000
	20,9	161	287	516	815	1145	1545	2400	3420	6300	9500	14000	19700	26500	35000	46000	60000	78000	102000	133000
	22,9	181	327	596	935	1315	1785	2750	4000	7500	11300	16700	23500	31500	41500	54000	71000	93000	121000	158000
	24,9	201	367	676	1055	1485	2015	3050	4450	8400	12700	18800	26500	35500	47000	61000	80000	105000	138000	182000
	26,9	221	407	756	1175	1645	2245	3400	5000	9300	14100	21000	29500	39500	52000	68000	90000	118000	155000	203000
	28,9	241	447	836	1295	1805	2465	3750	5450	10200	15500	23000	32500	43000	56500	75000	100000	132000	175000	230000
	30,9	261	487	916	1415	1965	2685	4100	6000	11200	16900	25000	35500	47000	61500	82000	109000	145000	195000	258000

Key: (1) Nominal diameter of thread d, mm; (2) Pitch of thread S, mm; (3) Strength class and conditional designation of group.



Test Loads for Bolts  
Fine thread  
kgf

Нормативные условия прочности d, мм																		
6	8	10	12	14	16	18	20	22	24	27	30	36	42	48				
0,6	0,8	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	5,0	6,0	7,0	8,0				
Шаг резьбы S, мм																		
0,6	0,8	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	5,0	6,0	7,0	8,0				
Класс прочности и условное обозначение группы	3.6	184	303	414	735	1150	1710	2460	3140	4060	5100	6250	7210	8300	11700	16300	22700	30200
	4.6	221	361	497	865	1360	2040	2820	3770	4840	6150	7550	8700	11200	14100	19500	27200	36300
	5.8	285	460	640	1140	1780	2600	3640	4800	6100	7800	9700	11200	14400	18100	25200	35000	45700
	6.8	276	454	620	1103	1730	2600	3520	4710	6100	7650	9400	10800	14000	17500	24400	34000	45300
	8.8	367	585	810	1430	2230	3350	4550	6100	7850	9900	12100	14000	18000	22400	31500	43900	58400
	9.8	332	550	765	1330	2070	3120	4210	5650	7300	9200	11300	13000	16800	21000	29300	40800	54100
	10.8	429	706	980	1710	2670	4030	5450	7300	9150	11900	14500	16800	21700	27100	37800	52700	70100
	12.8	465	766	1040	1860	2910	4370	5950	7950	10300	12900	15800	18200	23600	29500	41100	57200	76200
	14.8	570	936	1280	2290	3660	5550	7590	10300	13600	17400	21400	24300	31900	39900	56100	78100	103100
	16.8	775	1270	1740	3180	4950	7300	9900	13200	17100	21500	26400	30400	39300	49200	68400	95400	127000
	18.8	930	1530	2070	3720	5600	8180	11100	14900	19700	24900	30600	36500	47100	59000	82300	114500	152500
	20.8	1080	1790	2440	4350	6600	9300	12900	17500	23000	29200	37000	42500	56100	68900	96000	134000	178000
	22	176	290	404	708	1100	1680	2250	3010	3890	4940	6060	6950	8950	11700	15900	21700	28900
	24	485	795	1090	1940	3030	4560	6280	8290	10700	13500	16500	19000	24600	30700	42800	59300	79100
	26	575	940	1290	2270	3500	5100	7000	9350	12100	15000	18500	21500	28000	36300	50600	70500	93900
	28	485	795	1090	1940	3030	4560	6280	8290	10700	13500	16500	19000	24600	30700	42800	59600	79400
	30	660	1090	1490	2650	4130	6200	8450	11300	14600	18400	22500	25000	33500	41900	58400	81300	108700
	36	750	1230	1680	3000	4640	7050	9550	12800	16500	20800	25600	29100	37900	47500	66200	92700	124000

Key: (1) Nominal diameter of thread d, mm; (2) Pitch of thread S, mm; (3) Strength class and conditional designation of group.

## Test Loads for Nuts

Table 1

Coarse thread

kgf

Номинальный диаметр резьбы d, мм	Шаг резьбы S, мм												Класс прочности и условное обозначение группы											
	1,6	2	2,5	3	3,5	4	5	6	8	10	12	14	16	18	20	22	24	27	30	36	42	48		
Шаг резьбы S, мм	0,35	0,4	0,45	0,5	0,6	0,7	0,8	1	1,25	1,5	1,75	2	2	2,5	2,5	3,5	3	3	3	4	4,5	5		
4	40,8	83	136	200	270	350	470	605	805	1060	1320	1600	6300	7710	9800	12100	14100	16400	22400	32700	44900	58900		
5	43,5	101	170	250	340	440	570	710	920	1200	1500	1820	6750	7850	9600	12200	15100	17600	23000	28100	40800	56000	73600	
6	46,2	124	203	302	407	525	680	850	1080	1380	1700	2050	6900	9400	11500	14700	18200	21200	27500	33700	49000	67200	88300	
8	50,2	166	270	402	540	700	910	1140	1450	1830	2250	2700	8200	12600	15400	19600	24200	28200	36700	44900	65400	89600	118000	
10	52,7	207	340	500	680	900	1140	1420	1780	2200	2670	3180	11500	16700	19200	24500	30300	35300	45900	56100	81700	112000	147000	
12	55,2	248	407	605	810	1050	1300	1600	2010	2440	2900	3400	11800	18800	23000	29100	36400	42400	55100	67300	98000	134500	176500	
14	57,8	290	475	705	950	1230	1540	1900	2350	2810	3300	3800	16100	22000	26900	34300	42400	49400	64300	78500	114500	156500	200000	
16	60,3	332	540	800	1080	1400	1750	2150	2650	3150	3650	4200	16400	22500	27500	34500	42500	50500	65500	79500	115500	157500	201000	
18	62,8	374	610	900	1200	1550	1950	2400	2900	3400	3900	4500	16700	22800	27800	34800	42800	50800	65800	79800	115800	157800	201000	
20	65,3	416	680	1000	1320	1680	2080	2500	3000	3500	4000	4600	17000	23000	28000	35000	43000	51000	66000	80000	116000	158000	201000	
22	67,8	458	750	1100	1450	1850	2250	2700	3200	3700	4200	4800	17300	23500	28500	35500	43500	51500	66500	80500	116500	158500	201000	
24	70,3	500	820	1200	1550	1950	2350	2800	3300	3800	4300	4900	17600	23800	28800	35800	43800	51800	66800	80800	116800	158800	201000	
27	75,3	580	950	1400	1800	2250	2700	3200	3700	4200	4700	5300	18000	24500	29500	36500	44500	52500	67500	81500	117500	159500	201000	
30	77,8	622	1030	1500	1900	2350	2800	3300	3800	4300	4800	5400	18300	24800	29800	36800	44800	52800	67800	81800	117800	159800	201000	
36	82,8	720	1180	1700	2150	2600	3100	3600	4100	4600	5100	5700	18700	25500	30500	37500	45500	53500	68500	82500	118500	160500	201000	
42	87,8	810	1300	1900	2350	2800	3300	3800	4300	4800	5300	5900	19000	25800	30800	37800	45800	53800	68800	82800	118800	160800	201000	
48	90,3	852	1380	2000	2450	2900	3400	3900	4400	4900	5400	6000	19300	26100	31100	38100	46100	54100	69100	83100	119100	161100	201000	
56	95,3	940	1500	2150	2600	3100	3600	4100	4600	5100	5600	6200	19600	26400	31400	38400	46400	54400	69400	83400	119400	161400	201000	

Key: (1) Nominal diameter of thread d, mm; (2) Pitch of thread S, mm; (3) Strength class and conditional designation of group.

## Test Loads for Nuts

Fine thread

kgf

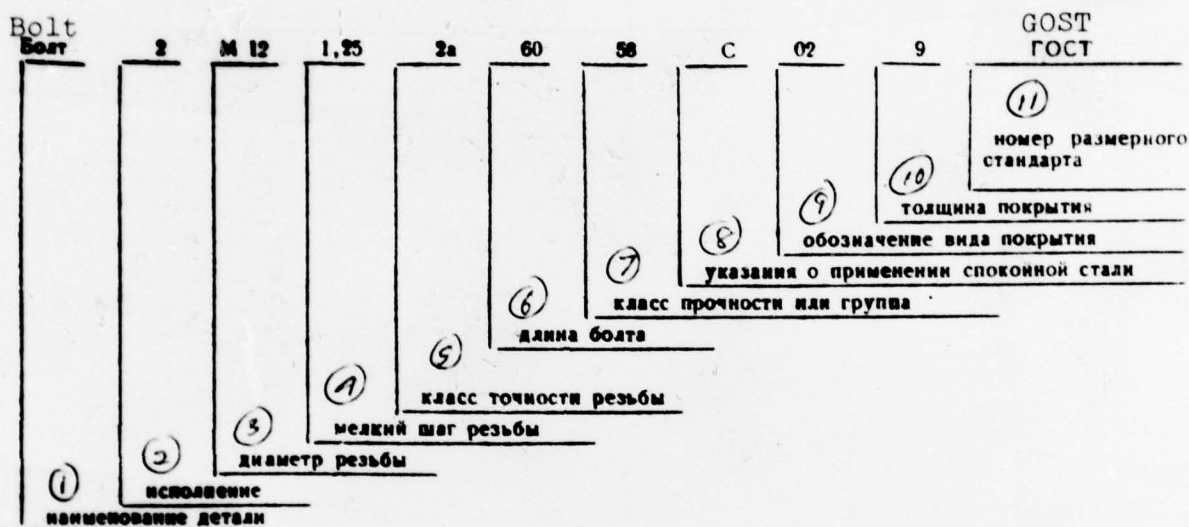
Номинальный диаметр резьбы d, мм		4	5	6	8	10	12	14	16	18	20	22	24	27	30	36	42	48
Шаг резьбы S, мм		0,8	0,8	0,75	1	1,25	1,25	1,5	1,5	1,8	1,8	1,8	2	2	2	3	3	3
Класс прочности и условное обозначение группы	4	392	645	890	1570	2480	3680	5000	6700	8650	10900	13300	15400	19800	24800	34600	48200	64200
	5	490	805	1100	1960	3080	4680	6260	8350	10800	13600	16600	19200	24800	31000	43200	60200	80200
	6	590	965	1320	2350	3670	5550	7500	10400	13000	16300	20000	23000	29800	37300	51900	72300	96300
	8	785	1290	1760	3140	4910	7330	10000	13400	17300	21800	26800	30700	39700	49700	68200	96400	129000
	10	980	1610	2200	3920	6100	9200	12200	16700	21000	27200	33300	38400	49500	62100	86500	120500	160500
	12	1180	1930	2640	4700	7350	11000	15000	20400	25900	32600	40000	46000	58500	74500	104000	144500	197500
	14	1370	2250	3080	5500	8350	12900	17500	23400	30200	38000	46600	53800	68400	86900	121000	168500	225000
	16	1510	2480	3380	6040	9180	13900	18700	25000	32000	40400	49600	57800	73200	92600	128000	176000	236000
	18	1650	2720	3680	6600	10000	15000	20000	27000	34500	43500	53000	61800	78200	99000	136000	186000	250000
	20	1790	2960	4000	7200	10800	16000	21500	29000	37000	46500	56500	65800	83500	106000	144000	196000	262000
	22	1930	3200	4300	7800	11800	17500	23500	31500	40000	50000	60500	70500	89500	113000	152000	206000	274000
	24	2070	3440	4600	8300	12800	19000	25500	34000	43000	53500	64500	75000	95500	120000	160000	216000	286000
	27	2310	3880	5200	9400	14000	21000	28500	38000	48500	59500	71500	83000	105000	130000	172000	230000	302000
	30	2550	4220	5600	10200	15000	22500	30500	40500	51500	63000	75500	87500	110000	136000	180000	240000	314000
	36	2990	4960	6500	11800	17500	26000	35000	46000	58000	70500	84000	98000	122000	150000	196000	260000	338000
	42	3430	5700	7400	13200	19500	29000	39000	51000	63500	77000	91500	106000	130000	160000	208000	274000	358000
	48	3870	6440	8300	14800	21500	32000	42500	55500	68500	83000	98500	114000	138000	170000	220000	290000	378000

Key: (1) Nominal diameter of thread d, mm; (2) Pitch of thread S, mm; (3) Strength class and conditional designation of group.

## Conditional Designations of Bolts, Screws, Studs and Nuts

1. Bolts, screws and studs made out of carbon steels of strength classes 3.6-6.9, nuts made out of carbon steels of strength classes 4-8, and parts made out of nonferrous alloys should be designated in the following manner:

Bolt 2M12x1.25.2a60.58.C.029 ГОСТ



Note. When designating parts made out of free-cutting steel, after the number which designates the strength class the letter A is indicated.

(Changed wording - "Inform. index of standards" No 3 1972).

Key: (1) Name of part; (2) Modification; (3) Thread diameter; (4) Fine pitch of thread; (5) Class of precision of thread; (6) Length of bolt; (7) Strength class or group; (8) Indication on the use of killed steel; (9) Designation of type of coating; (10) Thickness of coating; (11) Number of measuring standard.



2. Bolts, screws and studs of strength classes 8.8, 10.9 and nuts of strength classes 10, 12, 14, parts made out of corrosion-resisting, oxidation-resistant, heat-resistant and heatproof steels, and also parts, the material or coating of which are not provided for by the present standard, should be designated in the following manner:

Bolt 2M12x1.25.2ax60.88.35X.Tи6 ГОСТ

Болт	2	М 12	1.25	2а	60	88	35X	Ти	6	ГОСТ
(1) наименование детали	(2) исполнение	(3) диаметр резьбы	(4) мелкий шаг резьбы	(5) класс точности резьбы	(6) длина болта	(7) класс прочности или группа	(8) марка стали или сплава	(9) обозначение вида покрытия	(10) толщина покрытия	(11) номер размерного стандарта

(Changed wording - "Inform. index of standards" No 3 1972).

3. Class of precision of thread 3, major pitch of thread, use 1, type of coating 00 (without coating) are not indicated in the designation.

4. Thickness of a multilayer coating in conventional designation is indicated as general, total for all components

for example: coating M3N3Khl is designated - 0.47.

(Introduced additionally - "Inform. index of standards" No 3 1972).

Key: Same as the preceding chart, with the exception of No 8 - (8) Brand of steel or alloy.

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C509 BALLISTIC RES LABS	1	E408 AFWL	1
C510 AIR MOBILITY R&D	1	E410 ADTC	1
LAB/FIO		<del>E412 ASD</del>	<del>3</del>
C513 PICATINNY ARSENAL	1	FTD	
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C619 MIA REDSTONE	1	NIA/PHS	1
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